CLAIMS

1.- A device for generating an oscillating signal, the device comprising

- a means for providing a current of spin polarised charge carriers
- a magnetic excitable layer adapted for receiving said current of spin polarised charge carriers thus generating an oscillating signal with a frequency ν_{osc}, and
- an integrated means for interacting with said magnetic excitable layer to thereby select said oscillation frequency.

2.- A device according to claim 1, wherein said integrated means for interacting with said magnetic excitable layer is a means for controllable tunable interacting with said magnetic excitable layer such that a controllable tuning of said oscillation frequency is achieved.

3.- A device according to any of claims 1 to 2, wherein said interacting comprises performing magnetic interactions comprising inducing mechanical stress in said magnetic excitable layer.

4.- A device according to the previous claim, wherein said magnetic interactions are interface interactions.

5.- A device according to any of claims 1 to 4, wherein said interacting comprises performing any of magnetostatic interactions and exchange bias interactions.

6.- A device according to any of claims 1 to 5, wherein said magnetic excitable layer is a ferromagnetic semiconductor layer and said interacting comprises applying an electric field over said ferromagnetic semiconductor layer.

7.- A device according to any of claims 1 to 6, comprising a means for generating a magnetic bias field to bias the magnetic excitable layer.

8.- A device according to claim 7, wherein said means for generating a magnetic bias field is an anti ferromagnetic layer which is in at least partial magnetic contact with said magnetic excitable layer

9. - A device according to claim 8, comprising a means for generating stress upon said anti ferromagnetic layer.

10.- A device according to any of claims 7 to 9, wherein said means for generating said magnetic bias field comprises an element of ferromagnetic material which is magnetostatically coupled to said magnetic excitable layer.

11.- A device according to claim 10, further comprising a means for changing the geometric distances between said magnetic excitable layer and said ferromagnetic element.

12.- A device according to claim 11 wherein said means for changing the geometric distances consists of a piezoelectric layer or suspended structure.

13.- A device according to any of claims 1 to 12, wherein said integrated means for interacting with said magnetic excitable layer comprises an interacting layer, which is coupled magneto-elastically and/or magneto-statically and/or via the exchange bias effect to said magnetic excitable layer.

14.- A device according to claim 13, wherein said interacting layer is a piezoelectric layer.

15.- A device according to any of claims 13 to 14, wherein said interacting layer is an antiferromagnetic layer.

16.- A device according to any of claims 13 to 15, further comprising a surface acoustic wave generating means which can generate a Surface Acoustic Wave in said interacting layer.

17.- A device according to any of claims 13 to 16, wherein said interacting layer is a structural part of the Surface Acoustic Wave generating means.

18.- A device according to any of claims 16 to 17, wherein said Surface Acoustic Wave generating means generates a Surface Acoustic Wave in said interacting layer, which has a frequency essentially equal to the magnetic resonance frequency of said excitable layer, or an integer multiple thereof.

19.- A device according to any of claims 13 to 18, wherein at least 2 electrodes are provided on a surface or inside said interaction layer, which allow to induce stress in said interaction layer by putting an electrical potential difference over them.

20.- A device according to any of claims 13 to 19, comprising a means for generating stress in said interaction layer by physical force or pressure build up.

21.- A device according to any of claims 1 to 20, wherein said means for providing a current of spin polarised charge carriers is abutting on said magnetic excitable layer and comprises an electrode, a spin polarisation means and a current confinement structure.

22.- A device according to claim 21, wherein said means for providing a current of spin polarised charge carriers comprises a fixed layer with a constant magnetic polarisation through which the current is passing, before entering into the excitable layer.

23.- A device according to claim 22, wherein the fixed layer and excitable layer are separated by an interlayer to magnetic separate both layers.

24.- A device according to any of claims 1 to 23, further comprising a readout structure, which measures the excitation caused by the spin polarised current passing through said magnetic excitable layer or a related or equivalent parameter.

25.- A device according to any of claims 1 to 24, further comprising a readout structure, which measures the magneto-resistance or a related effect, generated by combination of the fixed layer and the magnetic excitable layer.

26.- A device according to any of claims 1 to 25, further comprising a readout structure, which comprises a piezoelectric measurement layer, which converts the precessional movement of the excitable layer into an electrical signal.

27.- A device according to any of claims 1 to 26, further comprising a readout structure, which measures the resistance change by measuring the AC signal between at least 2 electrodes in electrical contact with said excitable layer.

28.- A device according to any of claims 1 to 27, further comprising a readout structure, which measures the change of resistance or voltage in a lateral geometry.

29.- A method for generating oscillations, the method comprising

- providing a current of spin polarised charge carriers, thus generating an oscillating signal with an oscillation frequency ν_{osc} by interaction between said current of spin polarised charge carriers and a magnetic excitable layer, and
- controllably tuning said oscillation frequency ν_{osc} by inducing an interaction between an integrated means and said magnetic excitable layer.

30.- A method according to claim 29, wherein inducing an interaction between an integrated means and said magnetic excitable layer comprises any of inducing mechanical stress in said magnetic excitable layer, inducing exchange bias interactions and inducing magnetostatic interactions.

31.- A method according to any of claims 29 to 30, said magnetic excitable layer being a ferromagnetic semiconductor layer, wherein inducing an interaction is performed by applying an electric field over said ferromagnetic semiconductor layer.

32.- A method for reading out a magnetic element, the method comprising

- providing a current of spin polarised charge carriers, thus generating an oscillating signal with an oscillation frequency ν_{osc} by interaction between said current of spin polarised charge carriers and a magnetic excitable layer
- controllably tuning said oscillation frequency ν_{osc} by inducing an interaction between an integrated means and said magnetic excitable layer, and
- measuring an excitation, or a related or equivalent parameter, said excitation being caused by said spin polarised charge carriers